REMARKS/ARGUMENTS

Previously presented Claims 1 and 3-19 are pending in the Application. No claim is presently amended.

The withdrawal of all prior rejections and objections is appreciated. However, in response to Applicant's Amendment filed January 15, 2009, the Examiner entered a new ground of rejection of pending Claims 1 and 3-19 under 35 U.S.C. 103 over previously applied Westfall (US 2002/ 0116868 A1, published August 29, 2002) in view of Thompson (U.S. Patent 6,419,714 B2, issued July 16, 2002)(Office Action dated April 21, 2009 (OA), page 2, paragraph 10). Thompson appears to be relied upon by the Examiner to further define the fuel emulsifiers described by Westfall. Even with Thompson's further definitions of Westfall's fuel emulsifiers, however, the combined teachings of Westfall and Thompson do not reasonably suggest the fuel compositions Applicant claims because Thompson does not cure any of Westfall's deficiencies regarding the subject matter Applicant claims, especially with regard to the anti-cavitation additive Applicant employs in the claimed fuel and its purpose.

Preliminarily, Applicant does NOT add 30 ppm to 3% by weight of its anti-cavitation additive per total weight of the emulsion to a fuel for motor vehicles comprising a water/liquid hydrocarbon emulsion as "the anti-corrosion additive used in internal combustion engines as taught by THOMPSON" (OA, pp. 4-5, bridging ¶).[1] Anti-corrosion activity is chemical in nature. An anti-corrosion additive prevents deterioration of the metal lines of a fuel system resulting from chemical reactions between the metal containment system and the fuel additives, water content, and/or impurities. Rather, Applicant's anti-cavitation additive is designed to prevent or alleviate cavities which occur when the pressure

[1] Applicant has been unable to find a discussion of anti-corrosion activity or agents in either Westfall or Thompson.

exerted on a circulating liquid fuel is lower than the vapor pressure of the fuel itself (vaporous cavitation). Applicant's Specification teaches (Spec., p. 3, l. 19, to p. 4, l. 7)"

> [T]he liquid vaporizes locally and forms cavities. These cavities, which can flow through the circuit carried by the fluid, subsequently come into contact with higher pressure regions and collapse. The resulting implosion can be extremely violent and can cause vibrations, noise and damage to the materials forming the circuit.
>
> A phenomenon very similar to cavitation is generated by gases dissolved in the fluid (gaseous cavitation). If the pressure exerted on the liquid in a particular point is lower than the saturation pressure, the gas abandons the liquid forming bubbles. The bubbles initially increase in volume, but are then re-dissolved in the higher pressure areas of the circuit. . . . .

Regardless of the reason why the cavities form, they cause vibrations, noise and other physical damage to the system itself. Applicant's anti-cavitation additives are designed to alleviate the physical damage caused by cavity formation, not the chemical damage caused by metal-corrosive materials in the fuel. Accordingly, based on the teachings of Westfall and Thompson, the Examiner erred in stating (OA, pp. 4-5, bridging ¶):

> At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the fuel of WESTFALL by incorporating selected components of said composition of WESTFALL and by incorporating the concentrations of the composition of the anti-corrosion additive used in internal combustion engines as taught by THOMPSON.

With all due respect, it would not have been obvious in view of the teachings of Westfall and/or Thompson to add Applicant's anti-cavitation agents to fuel emulsions. The emulsifiers and/or alleged anti-corrosion agents Westfall and Thompson describe are not the same or substantially the same additives that Applicant employs to prevent cavitation in a fuel system. Moreover, the anti-cavitation additives in the fuel emulsion Applicant claims would not have been obvious to a person having ordinary skill in the art for use as emulsifiers or anti-corrosion agents in view of the combined teachings of Westfall and Thompson.

Emulsifying agents maintain the stability of the fuel emulsion and prevent separation of the two heterogeneous oil and water phases in the fuel emulsion. Anti-corrosion additives prevent chemical reactions with the metal parts of a fuel containment and delivery system.

Anti-cavitation additives are designed to prevent mechanical erosion to metal pipes. Anti-cavitation agents are not necessarily emulsifiers, and emulsifiers are not necessarily anti-cavitation agents. Anti-cavitation agents do not necessarily prevent chemical corrosion, and additives which prevent chemical corrosion do not necessarily prevent mechanical erosion to metal parts. Neither Westfall nor Thompson are concerned with preventing cavitation or the mechanical damage resulting therefrom.

The agents Westfall and Thompson describe are similar in composition to Applicant's anti-cavitation additives but they are not the same or substantially the same as Applicant's anti-cavitation additives. Applicant's fuels comprise an anti-cavitation additive comprising (Claim 1): (1) a copolymer prepared by copolymerizing 20-80% in moles of an ethylenically unsaturated carboxylic acid monomer containing at least one carboxylic acid group and 80-20% in moles of at least one other ethylenically unsaturated monomer, wherein . . . at least 20% in moles of the carboxylic acid groups in the copolymer is in the form of at least one derivative selected from the group consisting of carboxylate salt, ester, amide and imide derivatives of the carboxylic acid groups, and (2) the copolymer has an average molecular weight Mw ranging from 700 to 3000. The materials Westfall describes which are closest to Applicant's anti-cavitation additives are:

(i) at least one fuel-soluble product made by reacting at least one hydrocarbyl-substituted carboxylic acid acylating agent with ammonia or an amine wherein the hydrocarbyl substituent of said acylating agent has about 50 to about 500 carbon atoms and a number average molecular weight of 700-3000 [0100, 0109-0112]; and

(v) the reaction product of polyacidic polymer with at least one fuel soluble

> product made by reacting at least one hydrocarbyl-substituted carboxylic acid acylating agent with ammonia, an amine, a polyamine, an alkanol amine or hydroxyl amines [0104].

Westfall's additive (i) is not a copolymer formed by reacting an ethylenically unsaturated carboxylic acid monomer and at least one other ethylenically unsaturated monomer and may or may not have a number average molecular weight of 700-3000. Westfall's additive (v) is the cross-linked product of a polyacidic polymer and at least one reaction product of a hydrocarbyl-substituted carboxylic acid acylating agent and ammonia or an amine which appears to have a number average molecular weight far in excess of 3000.

The hydrocarbyl substituent of Westfall's hydrocarbyl-substituted carboxylic acid acylating agent additive has a number average molecular weight of 700-3000 [0110]. The hydrocarbyl substituent preferably is a polyisobutene substituent having a number average molecular weight of 700-3000 [0112]. More importantly, however, from the combined teachings of Westfall and Thompson, persons having ordinary skill in the art would have learned that Westfall's hydrocarbyl-substituted carboxylic acid acylating agent is not a copolymer having a number average molecular weight of 700-3000. Each hydrocarbyl-substituent of Westfall's hydrocarbyl-substituted carboxylic acid acylating agent does have a number average molecular weight of 700-3000, but the agent itself is not a copolymer prepared by copolymerizing an ethylenically unsaturated carboxylic acid monomer and at least one other ethylenically unsaturated monomer. Thompson expressly states (Thompson, col. 5, ll. 59-64; emphasis added):

> The hydrocarbyl-substituted carboxylic acid acylating agents may be made by reacting one or more alpha-beta olefinically unsaturated carboxylic acids reagents containing 2 to about 20 carbon atoms, exclusive of the carboxyl groups, with one or more olefin polymers . . . .

It should be evident therefrom that the alpha-beta olefinically unsaturated carboxylic acids reagents described by Westfall and Thompson are not copolymerized with at least one other

ethylenically unsaturated monomer as Applicant's claims require. Rather, the alpha-beta olefinically unsaturated carboxylic acids reagents described by Westfall and Thompson are reacted with one or more olefin polymers to make fuel soluble product (i). According to Thompson, the olefin polymers are derived from olefin monomers (Thompson, col. 6, ll. 24-67), but the olefin monomers are not then copolymerized with the alpha-beta olefinically unsaturated carboxylic acids reagents. The olefin polymers are themselves polymerization products (Thompson, col. 7, ll. 1-20).

At column 7, line 20, to column 8, l. 11 (especially col. 7, ll. 20-42), Thompson describes alternative methods for producing its hydrocarbyl-substituted carboxylic acid acylating agents which show that they are not copolymers. Thompson states (Thompson, col. 7, ll. 36-42):

> The production of these hydrocarbyl substituted succinic acids or anhydrides via alkylation of maleic acid or its derivatives with a halocarbon or via reaction of maleic acid or anhydride with an olefin polymer having a terminal double bond is well known . . . .

The combined prior art teachings would have taught persons having ordinary skill in the art that Westfall's hydrocarbyl-substituted carboxylic acid acylating agent is not a copolymer of an ethylenically unsaturated carboxylic acid monomer and at least one other ethylenically unsaturated monomer.

Westfall's (v) reaction product [0104] of a polyacidic polymer with at least one hydrocaryl-substituted carboxylic acid acylating agent is a polymer. However, Westfall's (v) reaction product [0104] is not produced by copolymerizing an ethylenically unsaturated carboxylic acid monomer and at least one other ethylenically unsaturated monomer as Applicant's claims require. Nor is Westfall's (v) reaction product [0104] a copolymer. And, it most certainly is not a copolymer having a number average molecular weight from 700 to 3000. Westfall instructs that the polyacidic polymers used in the reaction are themselves olefin/maleic anhydride copolymers [0128-0133]. To produce the desired emulsifiers for use

in fuels, Westfall's polyacidic polymers are further reacted with at least one hydrocarbyl-substituted carboxylic acid acylating agent modified by ammonia or amine [0104]. One hydrocarbyl-substituent itself has a number average molecular weight of 700-3000 [0110]. Therefore, given that the acid groups of the polyacidic polymer are crosslinked with a hydrocarbyl-substituted carboxylic acid acylating agents having a number average molecular weight of 700 to 3000, it would have been apparent to persons having ordinary skill in the art that Westfall's (v) reaction product [0104] of a polyacidic polymer with at least one hydrocaryl-substituted carboxylic acid acylating agent is a polymer which cannot possibly have a number average molecular weight from 700 to 3000. Nor is Westfall's (v) reaction product [0104] a copolymer. And, Westfall's (v) reaction product [0104] is not produced by copolymerizing an ethylenically unsaturated carboxylic acid monomer and at least one other ethylenically unsaturated monomer as Applicant's claims require. To the contrary, Westfall expressly states [0133], "[T]he emulsifier is described as a polyakenyl succinimide crosslinked with an olefin/maleic anhydride copolymer."

Thompson describes the same or substantially the same additives as Westfall. Of those additives, (i) and (v) are closest to the anti-cavitation additive Applicant utilizes in the claimed fuel. However, Applicant's anti-cavitation additive is a copolymer prepared by copolymerizing an ethylenically unsaturated carboxylic acid monomer and at least one other ethylenically unsaturated monomer and has an average molecular weight Mw ranging from 700 to 3000. No fuel additive Westfall or Thompson describes that has a number average molecular weight of 700-3000 is a copolymer of the kind Applicant employs as an anti-caviation additive. No fuel additive Westfall or Thompson describes which is a copolymer prepared by copolymerizing an ethylenically unsaturated carboxylic acid monomer and at least one other ethylenically unsaturated monomer. No fuel additive Westfall or Thompson describes is a copolymer having a number average molecular weight of 700-3000.

Applicant is not at all surprised by the fact that neither Westfall nor Thompson describes a fuel comprising one of Applicant's anti-cavitation additives. Neither Westfall nor Thompson was interested in preventing mechanical problems a fuel systems cause by cavitation. According to the Examiner, Westfall and Thompson are interested in preventing chemical corrosion to fuel systems caused by additives in the fuel. Applicant's emphasize the no emulsifier disclosed or reasonably suggested by Westfall and Thompson is an anti-cavitation additive defined by Applicant's claims.

Persons having ordinary skill in the art would have understood that the invention Applicant claims is neither described nor reasonably suggested by Westfall, Thompson, or any combination of their teachings. In fact, neither prior art reference recognized the problem Applicant's invention is intended to solve. With all due respect, Applicant's urge the Examiner to review the prior art teachings and reconsider the conclusion that the subject matter Applicant claims would have been of obviousness to a person having ordinary skill in the art over the applied prior art.

For the reasons stated herein, Applicant's claims are allowable over the applied prior art. Accordingly, early notice of allowance is earnestly requested.

Respectfully submitted,

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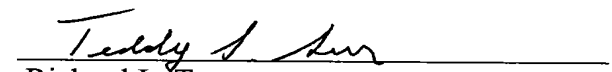

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